

AN INQUIRY INTO THE CLINICAL MANIFESTATIONS OF A
SYPHILITIC INFECTION UPON THE HEART.

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by

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1. INTRODUCTION.

It is generally accepted that the most frequent cause of Aortitis and of Aneurism of the Aorta is Syphilis, and these conditions are usually treated by Anti-syphilitic measures.

With diseases of the Heart itself, there is often no such certainty as to the etiological factor in a given case.

Apart from the acute types of Endocarditis due to the Streptococcus, Gonococcus, etc., and the disorders of the Heart definitely following Influenza, Trench Fever, Diphtheria and other acute illnesses, the largest share by far in the causation of Heart disease is agreed to be held by Acute Rheumatism.

Next to Rheumatism come Chorea, Tonsillitis, and Scarlet Fever. In 101 cases of Heart disease, Lewis (1) found a previous history of Rheumatic Fever or Chorea in 61%, and of Tonsillitis in 6%.

Frequently however cases are seen in which no Rheumatic history can be obtained, and yet where an undoubted infection is, or has been present.

The object of this inquiry has been to ascertain by all methods available, the proportion in which injury to the Heart by Syphilis occurs in clinical practice.

The/

The subject has been investigated from various standpoints. Through the courtesy of the Honorary staff of the Radcliffe Infirmary and County Hospital, Oxford, I have been enabled to look up the records of autopsies on cases of Heart disease over a period of years, and to correlate the Clinical and Post-Mortem findings.

Material has been obtained from the Pathological, Out-Patient, and Venereal Departments, as well as from the wards of the Hospital; from the Oxford Eye Hospital, Homes for mental defectives, Workhouse Infirmaries, and private sources. The Pensions Medical Board at Oxford has also furnished cases.

A close inquiry into the personal and family history of Patients with evidence of "Morbus Cordis" has been made, and special attention has been paid to the condition of the Heart in persons suffering from Syphilis in the various stages and in those where a previous history of Syphilis has been acknowledged or recorded.

In certain instances, signs suggestive of the disease, or a suspicious family history have, by themselves, led to the examination of the heart.

2. HISTORICAL.

In "A System of Syphilis", Osler and Gibson (2) state that Syphilis of the Heart was mentioned in the literature as far back as 1736.

French writers appear to have paid particular attention to the condition, and the names of Laennec, Bouillard, and Corvisart are frequently met with in descriptions of cases.

Lancereaux (3) mentions a case which was quoted in 1775 in the "Memoires de la Societie Royale de Medicine", of a young woman aged 22 who during life had marked signs of Syphilis, and who had cardiac symptoms and acute pain in the region of the Heart before death. At the Post-Mortem nearly the whole of the posterior surface of the Heart was found to be occupied by a large ulcer which had only a few muscular fibres in a thin layer as a base.

The same writer describes two cases where the wall of the left ventricle was very sensibly thickened and presented on section a smooth, shining, lardaceous looking surface of a yellowish grey colour and of a slightly unctuous consistence.

In Ricords (4) Atlas published in 1851 is an illustration of the heart from a man aged 41, who died suddenly and who had a history of having contracted a Chancre when 20 years of age, another /

another at 30, and possibly a third between these dates. In this specimen gummata in various stages are seen in the walls of both ventricles.

In 1862 Haldane (5) recorded the case of a young woman, 25 years of age, who died suddenly in a brothel in the High Street of Edinburgh. The Heart showed on the anterior surface of the left ventricle near the septum a flattened mass $\frac{1}{4}$ inch long by $\frac{1}{8}$ inch broad, slightly projecting, and when cut into, moderately firm and of a pinkish grey colour and extending $\frac{1}{8}$ inch into the muscular substance.

In 1863 Wilks (6) recorded the case of a man aged 29, who died suddenly without any previous illness, but who had been subject to fainting attacks since childhood. He was a hard-working man who suffered occasionally from severe momentary attacks of pain in the left side of the chest. At the autopsy the muscular wall of the right ventricle was found to be replaced by a solid tough mass of fibrous tissue extending from the mid ventricle upwards into the pulmonary artery, and of greatest thickness at the base of the Heart. This was regarded as probably of congenital origin.

In 1875 Pearce Gould (7) read before the Pathological Society of London a paper on the case of a man, aged 40, who had died suddenly, and the anterior wall of whose right ventricle was composed of a grey white material/

material extending into the auricle. The condition was thought to be a Carcinoma, but on microscopical examination was demonstrated to be a Gumma.

In 1878 Grenouiller (8) wrote a Paris thesis on Cardiac Syphilis, collecting twenty-four instances from various sources. He concluded that Syphilitic Myocarditis began as a small gumma and ended as a patch of sclerosis. He stated that the average date of onset after infection was ten years, although one case began during the first year. He considered that there were no special symptoms, though heart disease was frequently suspected and he found that two thirds of the cases terminated in sudden death.

Lang (9) in 1889 gave a complete bibliography to date, and published a table showing that over 84% of cases of Syphilis of the heart occur between the ages of 28 and 37 years of age.

Mauriac (10) in an exhaustive article quotes as an example the case of a man aged 25 who had been infected with Syphilis five years previously, and who came under observation when suffering from violent headaches (most severe at night), ulceration of the scalp, a slight cardiac hypertrophy and an aortic diastolic murmur. There was no history of rheumatism and there had been no cardiac symptoms until he began to have palpitation and tachycardia a few months before/

before being seen. The patient quickly responded to large doses of Iodide of Potassium and in five months there was no trace of the gummata of the scalp, the Heart appeared to be functioning naturally, and no bruit could be detected.

In 1897 Phillips (11) collected 25 fatal cases of Syphilitic disease of the heart wall and described in detail the lesions found at the Post-Mortem examination. In 20 of these cases sudden death occurred.

Sir Johnathan Hutchinson (12) quoted cases that have been recorded from time to time in this country, and includes one reported in 1875 by Dr Cayley where, in the wall of the left ventricle several roundish nodules of a whitish colour were found. This specimen came from a young man of 28 years of age who was known to have had Syphilis several years before. The same writer states that Mr Shattock in 1880 showed at the Pathological Society the heart of an infant where there was present in the right ventricle, a gumma involving the underside of the cusp of the pulmonary valve.

There are also recorded the cases described by Rolleston in 1893, where there were a number of white nodules in the wall of the right ventricle; a gummatous condition of the left testicle was also noted.

From the London Hospital in 1906 two similar cases with/

with gummata in the testicles are also mentioned by Hutchinson.

Several cases of congenital Syphilis in which the heart has been found to be affected, are also recorded.

Fournier (13 & 14) has noticed in subjects of inherited disease.-

1 instance of absence of the right heart.

4 instances of persistence of the ductus arteriosus.

5 instances of patent foramen ovale.

9 instances of congenital cyanosis.

2 instances of the narrowing of the pulmonary artery
& aorta.

1 instance of the narrowing of the mitral valve.

1 instance of aortic insufficiency

and, incidentally, he states that Raynaud's disease has been noted in cases of two newly born children suffering from hereditary syphilis.

This writer maintains that mitral stenosis is often the result of transmitted syphilis, being found not uncommonly in descendants of syphilitic parents, and he brings forward many instances to support this claim. He also mentions two cases of pulmonary stenosis which he believed to be of hereditary syphilitic origin.

Anderson (15) records a case of rupture of the ventricular wall in a five year old child, resulting from/

from myocarditis following inherited specific disease, and where spirochaetes were found in the heart muscle.

Warthin (16) holds the view that congenital disease of the heart is comparatively common, but the condition has to be looked for with the microscope. He believes it is a common cause of sudden death in infancy. Gummata, he states, are rare, and the lesions he describes occur in the form of areas of epithelioid proliferation along the course of the smallest vessels, and apparently arise from the walls or from the perivascular tissue. The muscle fibres in the neighbourhood undergo a necrosis. Spirochaetes can be found in large numbers.

Neugebauer (17) described three cases in the same family where there were symptoms of shortness of breath, precordial pain, and palpitation, and where on examination he found an enlarged heart and a double aortic murmur. The ages of the patients were respectively - 21 (female), 28 (male), and 17 (female). Their mother had had three previous miscarriages and in all the above cases the Wassermann reaction was positive, and there was no history of rheumatic fever. The same writer records a case of a girl, aged 18 years, with similar symptoms, with a positive Wassermann test but no antecedent illness. There was in this patient also, a double aortic murmur and the X-rays showed an/

an enlargement of the ascending aorta extending to the beginning of the arch.

On the other hand Findlay (18) is inclined to regard as rare, aortic disease due to congenital syphilis, but he cites the case of a boy, aged 15, with symptoms of precordial pain and breathlessness, with a double aortic murmur, cardiac enlargement and a Corrigan's pulse. The patient had well marked features of inherited lues, a positive Wassermann reaction, and no personal or family history of rheumatism.

3. PATHOLOGY.

All three layers of the heart may be affected by syphilitic changes.

Pericardium.

The pericardium is rarely involved in itself. As McPhedran (19) says in Osler & McCrae's system, the subject is one of academic rather than one of practical medicine. In Phillips' (11) series of 25 cases the pericardium was involved in five. Gummata of the pericardium are very rare.

Lancereaux (3) while admitting the rarity of the condition, accepted the possibility of a syphilitic infection of the pericardium either as fibrous bands between the visceral and parietal layers, or as small scattered gummata. Some writers consider that some of the "milk spots" may be of specific origin.

Oddo & Mattei (20) have recently described a case of syphilitic pericarditis in a man aged 25 years. The patient was admitted to hospital with well marked signs of secondary disease, and gave a history of 15 days' dyspnoea, worse for eight days previous to admission. Clinical features of pericarditis were present, together with marked cyanosis, swelling of the veins of the neck, and oedema of the legs. The Wassermann reaction was strongly positive. Under intravenous/

intravenous injections of mercury the patient improved for a time, and then relapsed. He rallied with Novarsenobenzol, but after the fourth administration collapsed from generalised pulmonary oedema.

At the autopsy numerous dull villous patches were found on both layers of the pericardium, and on microscopical examination these showed the typical appearances of a syphilitic lesion. The myocardium and endocardium were normal.

Myocardium.

The myocardium may exhibit either gummatous growths varying in size and situation, or areas of diffuse fibrosis which replace the muscular tissue partly by narrowing of the vessels from Endarteritis Obliterans, and partly by pressure of the proliferating connective tissue cells. Weakness of the muscle results, and aneurismal dilatations may occur.

Examples of such lesions are to be found in most hospital museums. In such cases the heart muscle is seen under the microscope to be replaced by a small cell infiltration with many fibrous tissue cells. The arteries appear thickened, especially in the media and adventitia.

Endocardium.

In the endocardium a common site of deposit is
on/

on the septal wall, but it may occur elsewhere and the disease then presents itself in the form of small localised thickenings, or as larger plate-like masses which often send fibrous processes into the myocardium.

Inflammation of the valves, due primarily to syphilis, has generally been considered as rare. As an acute infection the *spirochaeta pallida* is, according to Allbutt & Rolleston (21) very rarely, if ever, the cause. Indirectly syphilis was regarded as a possible cause of chronic endocarditis, acting through a general arterio-sclerosis. The aortic valves may be, and frequently are, affected by a spread of the inflammatory process from the aorta.

Longcope (22) considers that in 34% of cases of aortitis the valves are also affected and Symmers & Wallace (23) place the figure at 27% where aortitis is found associated with sclerosis and retraction of the aortic valves.

Turnbull (24) finds evidence of aortitis in over 60% of Post-Mortems in cases of acquired syphilis. In over 15% there was endocarditis of the aortic valves, which he attributes directly to syphilis. In just over 1% myocarditis was present.

Hutchinson (12) quotes instances of what have been termed condylomata of the valves of the heart and he accepts their syphilitic origin.

Moore (25) reports the case of a woman, 31 years of age, with mitral stenosis and aortic valvular disease, who had sores in the mouth, and a positive Wassermann reaction, and also that of a man aged 38 who had a condition diagnosed by several physicians as pulmonary stenosis, with commencing aortitis, both apparently of recent origin. The Wassermann reaction was strongly positive and the man's wife had been pregnant once and had aborted.

Aortitis is closely associated with syphilitic disease of the heart.

Turnbull (24) fails to find evidence that syphilis induces atheroma, but he believes that syphilitic inflammation of arteries is liable to lead to fatty degeneration and calcification. He has not found this inflammation to be confined to the intima of a large elastic artery as is the case in atheroma.

In the early stages there is a moderate degree of perivascular inflammation of the adventitia, extending into the media by way of the capillaries which are increased, and spreading into the intima. Muscular and elastic tissues begin to lose their structure due to pressure and swelling; in a later stage some atheromatous changes in the form of fatty degeneration and calcification occur.

The syphilitic inflammation in the early stages can/

can be distinguished from the atheromatous change by the so called rubbery consistence, the pearly colour, the longitudinal ridging and furrowing, and localised puckering, and the presence of spirochaetes in these areas.

In another article elsewhere, Turnbull (26) records two cases of aortitis in patients suffering from congenital syphilis, and gives the post-mortem findings.

One case was that of a girl, aged 17, whose father had died some time previously. At the autopsy he was found to have aortitis with involvement of the aortic valves. This girl herself suffered from shortness of breath and presented signs of a double murmur at the aortic area and an occasional presystolic murmur at the apex of the heart. She died suddenly, and at the post-mortem the left ventricle was very much hypertrophied and dilated, and the heart weighed 1 lb. There was a crenated and pithed zone in the first inch of the aorta.

In another case, that of a girl aged 7, the intima in the ascending and descending aorta was wrinkled and shewed nodular thickenings.

The coronary arteries may be affected by an endarteritis giving rise to a myocarditis in the area of the distribution of the vessels.

4. SYMPTOMS.

While there are no pathognomonic symptoms associated with syphilitic disease of the heart, there are certain features which are suggestive and which, if recognised, may lead to the relief of the patient's condition under appropriate treatment.

Symptoms depend largely on the site of the lesion. If the disease is limited to deposits of small size, and which are scattered in the heart wall, no disturbance of function may be detected, but these foci are always a potential source of cardiac weakness and failure. If of large size, and especially if near the apex of the heart, sudden death is liable to occur. This has been noted by many writers, and may occur very early in the course of the disease, as in a case, reported by Brooks (27), where before the rash had fully appeared death took place suddenly and a minute perforation of the wall of the aorta just above the ring, was found.

If the coronary arteries are involved in the inflammatory process there may be anginal attacks. These, if in a young man, and if of the true type and associated with referred pain or tenderness, should raise the suspicion of an infection by the spirochaeta pallida. So also should attacks of arrhythmia and tachycardia/

tachycardia without obvious cause.

The Stokes Adam syndrome may be the manifestation of a gummatous infiltration of the bundle of His, as in the case reported by Handford (28). The patient was a married woman, aged 32, who suffered from breathlessness, palpitation, etc., and whose heart action was very variable. For a time it would be quite regular and then suddenly the action would become irregular, and might cease altogether for as long as 15 seconds. During this period faint articular contractions could be made out on listening, but there was no impulse over the precordium and no pulse at the wrist. There was usually a slight general convulsion and after a few deep inspirations the regular action would be resumed, and consciousness would return. There was cardiac enlargement, a mitral systolic murmur and a faint diastolic murmur at the lower end of the sternum. The patient died in one of the attacks, and at the post-mortem examination there were found numerous gummata in the myocardium, especially in the neighbourhood of the auriculo-ventricular groove. The mitral valves were slightly incompetent and the valve curtains were a little thickened.

A remarkable case of involvement of the auriculo-ventricular bundle has been fully detailed by Keith & Miller (29).

A man with a history of a sore on the penis 20 years previously, came under observation for palpitation and syncopal attacks with loss of consciousness for a few seconds. Under treatment by iodides these symptoms gradually passed off, and until his death 12 years later from peritonitis following a perforation of the appendix, the patient had a pulse of about 42 beats per minute, and great dilatation of the veins of the right side of the abdominal wall.

When the heart was examined at the post-mortem, the superior vena cava was found to be completely destroyed, as also was the commencement and the upper half of the main auriculo-ventricular bundle. And yet at the time of the man's last illness there were no signs of heart failure, and it was thought that the recovery from the initial syncopal attacks was probably due to the remaining part of the auriculo-ventricular bundle taking on an automatic power of originating ventricular contraction.

Other symptoms of organic heart disease, such as shortness of breath on exertion, dyspnoea and palpitation, may of course be present.

A special variety of cardiac asthma is mentioned by Stockman (30) as having been regarded as suggestive of heart syphilis. In a collection of 76 cases of gummata of the heart wall, to which he himself adds 4, he/

he mentions tachycardia, arrhythmia and dyspnoea as the predominant symptoms, and in only 3 out of the 80 cases were there signs which might be regarded as anginal.

Luce (31) considers that syphilis of the heart may be diagnosed, (all other etiological factors having been excluded) if heart symptoms suddenly or gradually appear without any obvious clinical cause in young subjects with a positive blood Wassermann reaction. The localisation of syphilis in the septum may sometimes be established clinically by the appearance of valvular rupture, either spontaneous or following trauma, when a gummatous nodule in the region of the septum has broken through and opened communication between the right and left heart.

With or without slight cardiac enlargement and an occasional apical systolic murmur there may occur extra systoles; these and other slight irregularities of rhythm in a heart suspected of disease should never be dismissed as of no importance.

Extra systoles are frequently present in rheumatic affections of the heart, and according to Mackenzie (32) result from an increased excitability in the neighbourhood of the primitive cardiac tube. As this is a common site of syphilitic infection of the heart it is suggested that extra systoles in patients with evidence of specific disease may be an early manifestation/

manifestation of cardiac involvement. (See Series 3, No.62 and 68). There is a tendency at the present time not to attach much importance to premature contractions, and many writers, Osler & Mackenzie included, have cited instances of patients with these "carrying on" for years. The attitude of Lewis (33) regarding premature contractions as consisting of and bearing witness to defects, though they may be present constantly and for long periods without any other signs of cardiac disability, appears sound. Out of 121 cases of premature auricular and ventricular contractions as many as 86 were judged by Lewis to have a purely cardiac basis.

Symptoms such as have been described; angina, precordial pain, dyspnoea, and syncopal attacks with arrhythmia, tachycardia and extra systoles may occur early in the disease and may be associated with a slight rise of temperature.

Manifestations of heart block and the Stokes Adam syndrome occur in the later stages and indicate gross changes.

Although there are no distinctive signs of syphilitic infection of the heart, it is well when a patient presents himself with cardiac symptoms and signs without any history of the more usual infections, to suspect syphilis as a cause, as Chapman (34) insists, and to seek diligently for confirmatory evidence.

ORIGINAL OBSERVATIONS.

Series 1.

EVIDENCE OF CARDIAC SYPHILIS AT AUTOPSY.

5 cases.

Case 1. Gumma of Endocardium.

H.H. In the Pathological Museum at Oxford is a specimen of a heart which came from a man aged 37, an old soldier, with no definite history of syphilis, although the risk of infection was not denied.

While the patient was in hospital the heart was noted as being enlarged to the left: there was a soft systolic murmur at the apex, and the heart occasionally had a gallop rhythm. The impulse was forcible, but the sounds feeble.

The patient died suddenly and at the post-mortem examination the heart was found to be enlarged in all its cavities, least marked in the left auricle: the tricuspid orifice admitted 4 fingers and the mitral 3, but there was no endocarditis of the valves.

In the right auricle there was an old thickening 1 cm. broad, just below the entrance of the superior vena cava. In the left ventricle on the septal wall 2 cm. below the interval between the right and left anterior cusps of the aorta was a raised yellow area irregular in outline, about 2 cm. broad, covered by endocardium, which elsewhere was thickened.

The lesion interrupted an anterior branch of the bundle of His going to the anterior wall of the left ventricle. The endocardium covering the anterior wall was thickened and yellow, but was not raised.

Case 2. Fibrosis of Myocardium found in a patient with marked signs of tertiary Syphilis.

J.W. A man, aged 40, was admitted to hospital for an accidental gun-shot wound and died on the following day.

He was well nourished, had a sunken bridge of the nose, a recent gumma with a necrotic centre in the right calf and two gummata in the right tibia which was thickened and curved. The posterior part of the palate on the left side was eaten away by an old gumma, the cicatrix of which was visible. The heart was enlarged, with an excess of fat in the epicardium. The muscle was pale, with many fibrous trabeculae running in from the surface. There was some old perihepatitis, and both testicles showed areas of fibrosis.

Unfortunately it is not known whether this patient suffered from any symptoms or signs of cardiac disorder.

Case 3. Aneurismal dilatation of heart wall:
 Recent endocarditis.

(Here the acute condition overshadowed
the syphilitic lesion.)

F.P. aged 31 years. Patient was a man who gave a history of, 8 weeks before admission to hospital, having felt weak in the legs, especially the left, in getting out of bed in the morning. After breakfast he fell down. His wife stated that the left arm suddenly became weak and tremulous five months before admission. (? Embolus).

On admission to hospital the patient was tremulous in his speech, but coherent. He had two ulcers on the sole of the right foot which were looked upon as "perforating". The Wassermann test was positive and there was considerable cardiac enlargement, with a soft systolic murmur at the apex and a loud diastolic bruit in the aortic region conducted down the sternum. The temperature ranged between 102° - 105° for eight days and the diagnosis of malignant Endocarditis was made.

At the autopsy the heart was found to be enlarged; the aortic valve was almost entirely obliterated by masses of irregular clot, and the orifice of the aorta much encroached upon. Extending to the right was an aneurismal dilatation which was just beginning to break through into the right auricle above the attachment of the anterior part of the septal cusp.

Case 4. Thickenings of Endocardium;
Changes in Coronary Artery.

In the following case the clinical signs and appearances found in the heart of a young man strongly suggest syphilitic infection.

D.W. aged 35, was admitted to hospital with a recent history of shortness of breath and precordial pain. There was no history of acute rheumatism.

There are no records of a Wassermann test having been made, or of any infection by the Spirochaete Pallida.

With slight cardiac enlargement, the contractions were noted as being rapid, but only one in every three or five reached the wrist. With the first mitral sound was a faint systolic murmur.

The patient died suddenly, and at the post-mortem there were found in the septum of the left ventricle four (4) patches of old endocarditis each 0.5 cm. across.

There was some atheroma of the anterior branch of the left coronary artery, and in the liver were two small calcified nodules and a patch of peri-hepatitis.

Case 5. Co-existence of Syphilitic Aortitis and Sarcoma of Glands.

The possibility of another disease being present in addition to a syphilitic infection must not be forgotten. Such a condition should be suspected when anti-specific measures fail.

In the case of a man G.H., aged 52 years, there was a history of his having noticed, 18 months before coming to hospital, a swelling at the angle of the jaw on the left side, with the subsequent appearance of swellings in both groins associated with shortness of breath. He consulted his doctor because of his condition, and he was sent to the hospital with a provisional diagnosis of lymphadenoma.

There were masses of glands at each side of the neck and in the groins. The heart was slightly enlarged, and there was a faint systolic murmur at the apex and in the aortic area. The Spleen came down $\frac{1}{2}$ inch, and the Liver 2 inches below the costal margin.

With the exception of the patient's father having died of some cerebral condition at 45, the family history was not suggestive, and there was no acknowledgement of infection by the patient himself, but his serum gave a strongly positive reaction and he was/

was treated by injections of N.A.B. in spite of which he went steadily downhill.

When a post-mortem examination of the body was made, the heart was found to be much enlarged, with patchy thickenings on the pericardium, and a large "milk spot" on the right ventricle. The mitral valves were slightly thickened and admitted 3 fingers, the tricuspid 4. The aortic valves were slightly thickened especially at the attached edges. The base of the aorta was dilated and puckered with longitudinal striation, and patchy white scars. This condition extended throughout the thoracic aorta and was obviously syphilitic.

The Spleen was firm, and four times the ordinary size. On section it showed numerous raised, firm, whitish areas of irregular outline 1 - 5 mm. across. On microscopical examination these proved to be sarcomatous, as also were the glands.

In several cases where a diagnosis of acute or subacute infective endocarditis has been made, and where confirmatory evidence has been found in the blood or urine, the Wassermann reaction has been negative.

Series 2.

CASES WITH SIGNS OF CARDIAC LESIONS.

38 Cases.

Table 1. Aortic Disease.

Case 1. Aortic Incompetence. Patient was a man R.H. aged 46, who complained of occasional angina-like attacks and who had tenderness of the left biceps.

He presented signs of slight cardiac enlargement. At the apex of the heart there was an impure 1st sound, and a rough systolic bruit at the aortic base with an occasional regurgitant murmur.

There was a history of an obscure lesion of the central nervous system when the patient was 40 years old, the exact diagnosis of which does not appear to have been made. Patient had several attacks of unconsciousness while he was at work, and a transient paralysis of the lower limbs. Lead poisoning and disseminated sclerosis seem to have been considered specially.

No history of syphilis could be obtained, but the Wassermann reaction was positive and it is thought probable that the old attacks were of a specific nature. There are no abnormal signs in the central nervous system at the present date.

Case 2. Aortic Incompetence. J.B. Male, aged 47, old soldier, admitted to hospital for shortness of breath, oedema of legs, and ascites. Good colour, double aortic murmur, ascites, double pleural effusion, enlarged hard spleen, slight hepatic enlargement. History of Syphilis in India in 1895. Wassermann Reaction++++. Much improvement with Mercury and Iodides.

Case 3. Aortic Incompetence. E.M. Male, aged 38, old soldier. Visible pulsation in carotids, brachials, etc. Double aortic murmur. X-rays show dilated, very pulsatile aorta. No history of syphilis. Served in India, S. Africa, and Malta before the war of 1914-1918. Had Enteric fever in S. Africa. Wassermann Reaction++.

Case 4. Aortic Incompetence. A.E.W. Male, aged 21. Slight enlargement of heart. Double murmur over aortic area. No history of Rheumatic fever, or Syphilis. Wassermann Reaction++ .

Case 5. Aortic Incompetence. C.E.H. Male, aged 36.
 Considerable cardiac enlargement. Apex beat
 in 6th space in mid clavicular line.
 Systolic murmur at apex.
 No history of Rheumatic fever or Syphilis.
 Double murmur over aortic area with thrill.
 Wassermann Reaction+++.

Case 6. Aortic Incompetence. G.B. Male, aged 56.
 Slight enlargement of heart, systolic murmur
 over aortic region, and occasional diastolic.
 Had dysentery in Gallipoli.
 Wassermann Reaction inhibits haemolysis.

Case 7. Aortic Stenosis. R.S. Male, aged 22.
 Cardiac enlargement. Apex beat in 6th space
 in mid-clavicular line. Systolic murmur at
 aortic area, and at apex.
 Wassermann Reaction + .
 Gave a history of "paralysis" in Salonica
 in 1916. It was not possible to ascertain
 the exact nature of the illness. The positive
 blood reaction suggests that it may have been
 of syphilitic origin.

Case 8. Aortic stenosis. Mitral Incompetence.

F.A. Male, aged 55. Slight cardiac enlargement. Rough murmur over 2nd right costal space close to sternum and accentuated 2nd sound.

Syphilis in India 20 years before.

Wassermann Reaction negative.

Case 9. Aortitis. H.C. Male, aged 38.

Mild angina attacks. Aortic systolic murmur, with accentuated 2nd sound. X-ray showed general dilatation of whole arch of aorta, uniform in character.

Syphilis in India 14 years ago.

Wassermann Reaction negative.

Case 10. Aortic stenosis. W.J.B. Male, aged 48.

Slight enlargement of the heart, systolic murmur at aortic area with accentuated 2nd sound. Signs of old iritis, perforation of nasal septum and glossitis.

Syphilis in 1892.

Wassermann Reaction - No record.

Case 11. Aortitis. T.G.F. Male, aged 28.

Considerable cardiac enlargement. Precordial pulsation. Also visible pulsation in vessels in neck. Right pulse greater than left.

Double murmur at aortic base. Mitral systolic bruit. X-ray slight swelling in region of aortic arch.

History of "rheumatism" 7 years before.

No history of Syphilis.

Wassermann Reaction++.

Case 12. Aortic Incompetence. R.H. Male, aged 21.

Considerable cardiac enlargement. Double aortic murmur with a Flint's murmur at the Apex.

History of Scarlet fever when 7.

None of Syphilis.

Wassermann Reaction Negative.

This man went through eleven months training in England in the Infantry. He was stopped on a draft because of his heart.

Case 13./

Case 13. Aortic Incompetence. J.W. Male, aged 38.

Much enlargement of heart. Pulsation in Precordium and to right of Sternum. Double aortic murmur. Apical systolic murmur.

Rheumatic fever when 31.

Wassermann Reaction negative.

Case 14. Aortic Incompetence. H.B. Male, aged 38.

Considerable cardiac enlargement. Apex beat in 6th space, 1 inch external to mid-clavicular line. Aortic diastolic murmur.

Rheumatic fever when 9. Rejected for army because of heart which patient had known to be "weak" for years.

Notwithstanding the aortic disease, and the existence of diabetes, now held in check, this patient continues to carry out his duties in a laboratory.

Wassermann reaction negative.

Table 2.

How far may Syphilis be responsible for Mitral disease?

Case 15. (No.1)

Mitral Stenosis. L.A.O. Male, aged 22.

Chorea when 5 and 7.

Wassermann negative.

Case 16. (No.2)

Mitral Stenosis and Incompetence.

E.W. Male, aged 31.

Rheumatic fever when young.

Wassermann Negative.

Case 17. (No.3)

Mitral Stenosis and Incompetence.

H.B. Male, aged 35.

Rheumatic fever when 28.

No knowledge of a previous attack.

Wassermann negative.

Case 18. (No.4)

Mitral stenosis and Incompetence.

F.P.B. Male, aged 21.

Rheumatic fever when 12.

This man served for 12 months in the infantry
in England, and for 5 months in France.

Wassermann negative.

Case 19. (No.5)

Mitral Stenosis.

G.H. Male, aged 31.

No history of Rheumatic fever or Syphilis.

This patient was in hospital when 17 and was noted as having a presystolic murmur at the apex, with a thrill. He was rejected for military service because of this. At the date of examination (April 1920), there was a well marked obstructive bruit in the mitral area. He is able to do full work and finds no disability.

Wassermann reaction++++ .

Case 20. (No.6)

Old Mitral Stenosis and Incompetence.

G.F. Male, aged 25.

When in hospital, aged 14, was noted by different observers as having a presystolic and systolic murmur and thrill on various occasions, with subacute rheumatism.

His heart is now (December 1919) apparently natural and he feels quite well.

Wassermann negative.

Case 21./

Case 21. (No.7)

Old Mitral Stenosis.

R.F. Male, aged 28.

In 1914, subsequent to an attack of acute rheumatism, was noted by two different medical boards as having a thrill, and a presystolic murmur.

This ^{is} no longer present 6 years later, and the heart appears natural.

Wassermann negative.

Case 22. (No.8)

Old Mitral Stenosis and Incompetence.

J.F. Male, aged 40.

In 1911, and again in May 1916, was noted as having a double mitral murmur.

This is not now present and there is no cardiac enlargement, and the sounds are clear.

Wassermann negative.

Mitral Incompetence.

Case 23. (No.1)

J.T. Male, 37, with a history of several attacks of rheumatism, Wassermann reaction negative.

Case 24. (No.2)

C.B. Male, aged 22, suffered from acute rheumatism in 1916. Wassermann reaction negative.

Case 25. (No.3)

S.M.A. Male, aged 30, gave no definite history of a previous illness. Wassermann reaction negative.

Case 26. (No.4)

J.A.T. Male, aged 40, had rheumatism while serving in France. Wassermann reaction negative.

Case 27. (No.5)

M.B.A. Male, aged 26, with no previous illness. Wassermann reaction negative.

Case 28./

Case 28. (No.6)

J.V.S. Male, aged 28, Rheumatic Fever when
21. Wassermann reaction negative.

Case 29. (No.7)

E.A. Male, aged 32, gave a history of the
heart affection having come on after being
wounded; apparently with a form of chorea,
according to the medical case sheet.

Wassermann reaction negative.

Table 3. Cases 30 - 38.

Cardiac disorders other than valvular, investigated for the purpose of ascertaining the proportion with associated syphilitic disease.

Case 30. (No.1)

? "Pericarditis".

G.A.G. Male, aged 21, gave a history of scarlet fever when 12 years old. He had a rough systolic murmur over the precordium, especially to the left of the sternum, persisting while under observation for several months.

The Wassermann reaction was negative.

Case 31. (No.2)

"Myocarditis".

J.A.G. Male, aged 24, with slight cardiac enlargement, and systolic murmur over the precordium; a muscle infection dating from an attack of malaria in 1917.

Wassermann reaction negative.

Case 32. (No.3) /

Case 32. (No.3)

"Myocarditis".

A.M. Male, aged 35, had influenza before the onset of the cardiac symptoms. Shows signs of slight enlargement of the heart, extra systoles and irregular pulse.

Wassermann reaction was negative.

Case 33. (No.4)

"Myocarditis".

F.S. Male, aged 46, had rheumatism in 1917. At the time of the examination the 1st mitral sound was impure and he had occasional extra-systoles.

Wassermann reaction was negative.

Case 34. (No.5)

Myocarditis, ? Coronary artery disease,
Alternation of heart.

H.H. Male, aged 50.

When first seen this patient showed signs of slight hypertrophy of the heart, with a systolic bruit at the apex and in the aortic area, with alternating strong and weak beats and a "pulsus alternans". The blood serum inhibited haemolysis.

When/

When examined again 5 months later the heart was enlarged slightly as before, with the systolic apical murmur.

The alternating strength of beats could not be made out by the stethoscope but was demonstrated on the sphygmomanometer. About every 4th beat was missed at the pulse, and there were occasional extra systoles.

The patient had a history of malaria in 1917, and complained of some precordial pain, with tenderness below the left nipple, and he appeared to have mild syncopal attacks.

(See p. 47)

Case 35. (No.6)

Myocarditis.

J.N. Male, aged 19.

A tall "weedy" lad with a funnel-shaped depression of the chest. The apex beat was in the 5th space in the mid-clavicular line, and he had a faint systolic murmur at the aortic area propagated into the right carotid and subclavian arteries. There was a marked pumping action of the heart with no corresponding pulsation in the neck arteries.

(See p. 47)

The Wassermann reaction was negative.

Case 36. (No.7)

Myocarditis with ? involvement of the auriculo-ventricular bundle.

W.H. Male, aged 42.

Admitted to hospital for pain of an angina-like character at varying intervals, with fainting attacks and shortness of breath on exertion.

P.H. When 12 he had inflammation of the lungs followed by erysipelas, since when he had always had a "weak" heart.

F.H. Patient is not very clear about this, as he has not lived much at home. Both parents died of carcinoma soon after reaching 50 years of age. Two sisters died at four years interval, each aged 20, one apparently from some cerebral lesion and the other from some condition in which "fits" of several months' duration were the most prominent feature.

While in hospital the most outstanding points in the patient's illness were the bradycardia, pulse 44 - 48 per minute, of poor quality, and the mild syncopal attacks without actual loss of consciousness. There was definite enlargement of the heart; the apex being $4\frac{1}{2}$ inches from the mid-sternal line and the right border 1 inch to the right. A long rather rough systolic murmur was audible at the apex and the base, loudest in the pulmonary area.

Wassermann reaction++++.

Case 37. (No.8) Myocarditis.

H.D. Male, aged 40.

An old soldier sent to Hospital from the Pensions Medical Board as "D.A.H." for observation. Complaint.- giddiness and shortness of breath, and faintness, for 18 months.

P.H. Syphilis in 1903.

Condition while in Hospital.

Depressed scar on forehead ? old gumma.

Slight cardiac enlargement.

Marked tachycardia (140) with extra systoles.

Heart contractions strong, with a poor pulse in comparison. With first mitral sound a faint systolic murmur is heard.

Wassermann reaction++++.

Case 38. (No.9)

Myocarditis. A.B. Female, aged 50.

Complaint.- Attacks of pain in precordial region, and palpitation of some years duration. Patient had 9 children, one of whom died from convulsions, aged 5 months. Also 3 miscarriages early in her married life. Her husband attended the eye hospital 6 years ago/

ago and now suffers from "nervous debility". The records of the Eye Hospital show the husband to have suffered from "Keratitis". The Wassermann reaction was positive and the condition cleared up under anti-specific treatment.

Patient's Wassermann is + + + + . The heart is not enlarged and the action is steady. There is a systolic murmur at the apex.

S U M M A R Y.

Aortic cases.

Of 14 cases of aortic disease 10 gave a history of syphilis, or a positive Wassermann reaction, or both.

The ages were 46, 21, 36, 22, 55, 38, 48, 47, 38, 28. The last gave an indefinite history of rheumatism also.

One patient aged 56 gave an uncertain serum reaction. Although the changes in the aortic valves in this case may be atheromatous, syphilis cannot be absolutely excluded.

Three cases aged 21, 38, 38, with a negative Wassermann reaction had a history of rheumatic fever in 2 instances, and of scarlet fever in the other.

While the number of patients examined was admittedly small, and the conclusions therefore to be drawn cannot be so definite, the results are more akin to the findings of Boyd Campbell (35) in whose series of 25 cases with aortic lesions there was only 1 negative Wassermann reaction, and in that one patient there was a definite history of rheumatism, than to the figures given by Lewis (36).

The latter writer says that of 66 aortic cases only 8 gave a positive Wassermann reaction or a history of syphilis, and those were for the most part men over 40. Six of the above series of 10 "positives" were under/

under 40. Dilatation of the aorta or actual aneurism, he also states is rare, only half a dozen cases among some 5000. He attributes aortic disease to rheumatic fever or chorea in 54% of cases.

Mitral cases.

(1) Stenosis.

Of the 8 cases included in the "Mitral stenosis" table, three did not present the characteristic signs of that lesion when examined, though in each instance its existence had been previously noted on more than one occasion. Is it possible that in these cases the valves may have become apparently sound in the course of a varying number of years?

All three patients have a negative Wassermann reaction. Of the remaining 5, 4 had a definite history of rheumatic fever or chorea, and a negative serum test.

The patient with the strongly positive Wassermann reaction may possibly be an example of mitral stenosis due to inherited specific disease such as Fournier (13-14) recognised. The patient's mother had a stroke at the age of 52 and again at 56 years of age.

Lewis(36) considers that rheumatic fever and chorea are responsible for 65% of the cases of mitral stenosis, leaving the etiology of a large number to be accounted for.

Of the 16 cases in the Mitral disease series, 1 is looked upon as having a syphilitic basis.

In table 3, "Cardiac disorders other than valvular", the first four had a negative Wassermann reaction and a definite infection previous to the onset of the heart condition.

Patient No.5 had, it is true, a history of malaria, but there was also a strong possibility of an inherited syphilitic infection. The patient's father had served in the army abroad for many years, and his mother had aborted on two occasions. It is probable that there was a lesion of the coronary arteries, with a consequent myocarditis, due to inherited lues, and which may have been lighted up by a malarial infection.

Patient No.6 probably also had a myocardial infection following transmitted syphilis. His mother is known to have suffered from aneurism of the aorta.

The case of Patient No.7 is highly suggestive of a congenital infection of the heart muscle involving the bundle of His.

Patients No.8 and No.9 are probably examples of myocardial changes of a specific nature in acquired disease.

Series 3.

SHOWING THE RESULT OF THE EXAMINATION OF THE HEART

IN A SERIES OF CASES WITH EVIDENCE OR HISTORY

OF SYPHILIS.

1-33.

14 Patients with Congenital Syphilis.

No.	Sex.	Age.	Signs.	Wassermann.	Heart.
1	M	25	Ulceration of Pharynx	++++	Normal.
2	F	23	Hutchinson teeth, iritis deafness.	No record	Normal.
3	F	23	Iridocyclitis	No record	Normal.
4	F	18	Hutchinson teeth, opac- ities in both eyes. Total deafness.	No record	Normal.
5	F	19	Depression of Frontal bone. "Saddle Nose".	++++	Normal.
6	F	Baby	Snuffles. Rash on buttock.	No record	Normal.
7	M	Baby 9/12	Hydrocephalic head, Prominent veins.	No record	Normal.
8	F	7	Interstitial Keratitis	No record	Normal.
9	N	8	Interstitial Keratitis	No record	Normal.
10	F	20	Interstitial Keratitis	No record	Normal.
11	F	12	Interstitial Keratitis	No record	Normal.
12	F	28	Interstitial Keratitis	No record	Normal.
13	F	27	Depression on frontal bone. Suspicious teeth	+	Complains of pain in aortic region. Shortness of breath. 1st aortic sound replaced by a murmur; 2nd sound accentuated. X-ray negative. See p. 56.
14	F	5	Interstitial Keratitis	No record	Normal.

15-33 In addition to the foregoing, 12 children of years ranging between 4 and 12, and 7 mentally defective women, inmates of special homes, with family histories or appearances suggestive of a possible transmitted taint, were examined, but no abnormal physical signs were found in the Heart.

34-49.

6 Patients with Primary Syphilis.

No.	Sex.	Age.	Signs.	Wassermann	
34	M	26	Chancre on Penis (with Spirochaetes) Glands in Groins.	+	Normal, except slight irregu- larity without other signs or symptoms.
35	M	26	Chancre on Penis, Glands in Groin.	+++	Normal.
36	M	35	Chancre on Penis, Glands in Groins.	+++	Normal.
37	M	38	Chancre on Penis, Glands in Groins.	++++	Normal.
38	M	30	Chancre on Penis, Glands in Groins.	++++	Normal.
39	M	21	Chancre on Penis, Glands in Groins.	++++	Normal.

39-62

23 Patients with Secondary Syphilis.

No.	Sex.	Age.	Signs.	Wassermann	Heart.
40	M	26	Spirochaetes from Chancre 14 months before.	No record	Normal.
41	M	21	Chancre 3 months before, with phimosis	+	Normal.
42	M	45	Chancre 2 months before.	++++	Normal.
43	M	21	Rash	++	Normal.
44	M	27	General rash	++++	Loud murmur to left of Sternum in erect position only.
45	M	43	Rash	+	Normal.
46	M	29	Rash	++++	Normal.
47	M	58	Rash. Sloughing of part of Glans Penis	++++	Normal.
48	M	24	Mucous patches in the mouth.	No record.	Normal
49	F	18	Rash. Ulceration of Fauces.	++++	Normal.
50	M	25	Dermatitis, following N.A.B. injections. Chancre 4 months before.	No record.	Normal.
51	M	28	Condyloma round Anus.	++++	Normal.



Secondary Syphilis (continued).

No.	Sex.	Age.	Signs.	Wassermann.	Heart.
52	F	11	Muscular rash, Ulceration of Tonsil.	++++	Normal.
53	F	13	Sore throat. Snail track. Ulceration both Tonsils.	++++	Normal.
The above two patients are sisters. The father who is an old soldier, has a positive Wassermann.					
54	M	22	Chancre 3 months before with Spirochaetes.	No record.	Normal.
55	M	42	Rash.	+++	Normal.
56	F	22	Condylomata.	++++	Normal.
57	M	29	Sore throat. Rash.	+++	Normal.
58	M	35	Rash.	+	Normal.
59	F	29	Mucous patches in mouth. Ulceration beginning in Soft Palate.	++++	Normal.
60	F	26	Rash.	++++	Normal.
61	M	32	Rash. Ulceration of Tonsils.	++++	Normal.
62	M	32	Mucous patches. Glossitis and hoarseness.	++++	Precordial pain. Cardiac action very irregular with marked extra systoles. (See Summary p. 56)

63-70.

8 Patients with Tertiary Syphilis.

No.	Sex.	Age.	Signs.	Wassermann	Heart.
63	M	35	Punched out leg ulcers.	+	Normal.
64	F	51	Ulcer Frontal bone.	++++	Normal.
65	M	42	Perforation of Palate, Destruction of Nasal bones. Infection 15 years before.	No record	Normal.
66	M	44	Deep ulceration of Throat.	+++	Normal.
67	M	47	Perforation of Nasal Septum.	+++	Normal.
68	M	48	Ulceration of Tongue	+++	Heart enlarged. Irregular pulse with extra systoles. (See summary p.56)
69	F	31	Ulcers of Forehead & right side of Jaw.	+++	Normal. Right External Carotid had been tied for aneurism 2 years before.
70	M	45	Ulcer over head of Fibula.	++	Normal.

71-75.

5 Patients with Para-syphilitic lesions.

No.	Sex.	Age.	Signs.	Wassermann.	Heart.
71	M	34	Tabes Dorsalis. Argyll-Robertson pupils. Ataxia.	++++	Normal.
72	M	52	Paraplegia.	++	Normal.
73	M	64	Tabes Dorsalis. History of Syphilis 36 years previously.	+	Much enlarged. Apex 1 inch outside mid- clavicular line. Occasionally extra systoles. 1st Mitral sound rough. (See p.56)
74	M	24	Myelitis	++	Normal.
75	M	37	Tabes Dorsalis. Ataxia. Argyll- Robertson pupils	Negative.	Normal.
		Patient was invalided from R.N. with Tabes.			

76-87.

12 Patients with a past history of Syphilis
or Positive Blood Test.

No.	Sex.	Age.	Signs.	Wassermann.	Heart.	Remarks.
76	M	22	None	+++	Normal.	Wife under treatment.
77	M	25	None	No record	Normal	Treated 2 years ago for Syphilis.
78	M	30	None	No record	Normal	History of Syphilis 3 years ago.
79	F	21	None	++++	Normal	Mother of No.6.
80	M	26	None	Negative	Normal	Treated 2 years before for Syphilis.
81	F	36	None	++	Normal	Patient had a still born child.
82	M	23	None	No record	Normal	Treated 2 years previously.
83	M	25	None	No record	Normal	Infection 2 years before.
84	M	30	None	No record	Normal	Infection 1 year ago.
85	M	32	None	No record	Normal	Syphilis 10 years before.
86	M	35	None	No record	Normal	Syphilis 15 years before.
87	F	29	None	Negative	Normal	Treated for Syphilis 3 years before.

SUMMARY AND DISCUSSION.

Out of 33 patients of various ages, with evidence of Congenital Syphilis, one, No.13, presented signs of a Cardiac lesion, (commencing aortitis). A brother of this patient died from Locomotor Ataxia, aged 26.

No abnormal signs were discovered in the hearts of 6 patients with the disease in the primary stage.

Twenty-three (23) patients with Secondary Syphilis were examined and one of them showed what was considered to be involvement of the heart.

No.62, a man, aged 32, was admitted to Oxford prison, and while undergoing the ordinary medical examination, was found to have marked signs of Secondary Syphilis. He complained of pain over the pre-cordial region, and the cardiac action was very irregular with many extra systoles.

After a few weeks' treatment by mercury, the heart condition had markedly improved.

Out of 8 cases with tertiary manifestations, one, No.68, showed signs of a definite change in the heart. The patient was an old regular soldier, aged 48, with a history of a soft sore some years previously, but no clear history of Syphilis.

The/

The apex beat was in the 5th space, $\frac{1}{2}$ an inch outside the mid-clavicular line. The action of the heart was very irregular, with many extra systoles, but no murmurs. Some pain down the left arm was complained of.

Under treatment by anti-specific remedies the ulcer of the tongue has greatly improved, and the irregularity of the heart's action has disappeared, while the apex beat appears to have come in to just within the mid-clavicular line.

Among the five (5) cases of nervous manifestations with a probable syphilitic basis, (including No.75 where infection was denied, and the serum reaction was negative) one, No.73, showed gross lesion of the heart. Taking into account the age of the patient and the thick condition of the arteries, the condition was probably primarily a specific arteritis, including the coronary arteries, with a subsequent involvement of the heart.

During the course of these investigations, 3 patients have been met with who contracted Syphilis while already suffering from valvular disease of the heart.

Case 1. F.S. Male, aged 24.

This patient in 1912 had Rheumatic Fever and was in bed for 7 weeks. He joined the army in 1915 as A1. In 1917, while serving abroad, he began to suffer from giddiness, and attacks of loss of consciousness. In 1918 he was sent down the line as V. D. H., marked B3. He returned to England in March 1919, and in October 1919 contracted Syphilis. He attended the Venereal clinic in February 1920 with Granulomata of Corona Penis, Scrotum, and arm, and palmar, and plantar Keratoderma.

The Wassermann reaction was + + + +.

The patient had a loud mitral systolic murmur conducted into the axilla, with slight enlargement of the heart.

Case 2. J.W. Male, aged 28.

In December 1915 he attested, and he was called up in March 1917. While training during March and April 1917, patient complained of precordial pain, and shortness of breath. In June 1917 he contracted Syphilis/

Syphilis and his medical history sheet recorded that he had a positive Wassermann, and that he was treated with "606" and mercury cream, and that in November 1917 his blood was negative.

In May 1920 he had signs of slight cardiac enlargement, and a Mitral regurgitant murmur. There was a history of Scarlet fever in early life. The onset of the cardiac symptoms was, as previously noted, 2 months before the patient contracted Syphilis, and it is probable that the heart muscle having been damaged by Scarlet fever, was not able to stand the subsequent strain of training.

Case 3. A.S. Male, aged 21.

This patient attended the Venereal Disease Department with a history of a sore on the Penis for 14 days. He had a typical hard chancre, and his blood was strongly positive.

He stated that he had a "weak heart", and he presented well marked signs of Mitral Stenosis.

He said he passed into the Army as A1 in February 1917, and that 3 months afterwards he had Tonsillitis. On arriving in France in November 1917 he was "boarded", and placed in B2, because of his heart. In April 1920 he contracted Syphilis.

Sufficient time has not yet elapsed to ascertain what effect, if any, the luetic infection has had on a damaged organ, but these cases serve to show the importance of obtaining an exact history of the time of appearance of the two conditions.

C O N C L U S I O N S .

Syphilis, either in the acquired or congenital varieties of the disease, may affect any layer of the heart. In both, the lesion may commence early in the infection or it may not manifest itself till a late stage.

The pericardium is affected only occasionally, and then usually by a spread from the myocardium.

In the muscular layer, gummata are comparatively frequent, and may be single or multiple. Many such cases have been described. A fibrosis may result from syphilitic infection of the myocardium, and give rise to a weakening of the heart wall and possibly to aneurism.

The Endocardium is a fairly common site of gummatous infiltration and the valves may be directly attacked.

When an Aortic lesion is present the most common cause in a patient below middle age, is Syphilis.

Over 70% of the cases examined had evidence of specific infection. Only one of the patients in this group was over 50 years of age, six being under 40.

Signs of Aortic disease were found in 1 out of 33 cases of Congenital Syphilis.

Rheumatic/

Rheumatic Fever is a much less common cause of Aortic disease.

On the other hand the Rheumatic group of infections appears to be the commonest cause of Mitral lesions, but Syphilis may give rise to them.

Mitral Stenosis may be the result of inherited lues, and in one instance of the sixteen cases of Mitral disease which were examined, transmitted syphilitic infection appears to have been the most probable cause.

Pulmonary valvular lesions have been described as occurring both in acquired and congenital disease.

No symptom, or group of symptoms is characteristic, but even apart from the Wassermann test, careful clinical examination may reveal the probability or the certainty, of a syphilitic infection.

Symptoms depend to a large extent on the site and the stage of the lesion.

Symptoms and physical signs may be absent, and the condition may be discovered only at autopsy.

A gumma near the apex of the heart may cause sudden death. If in the Auriculo Ventricular bundle, signs of heart block or of the Stokes Adams syndrome may result.

Disordered action of the Heart, as evidenced by tachycardia, arrhythmia and extra systoles, associated with/

with anginal pain and syncopal attacks, may be the result of a Syphilitic infection where no other cause is obvious.

Although Syphilis is only one of the causes of cardiac disease, it is essential that all probable cases should be immediately recognised, and when clinical work is carried on under conditions which permit of it, the Wassermann reaction should be a routine test.